

3rd Six Weeks – Week 3.2**LINEAR FUNCTIONS UNIT VOCABULARY**

Direct variation	Inequality	Intercepts	Linear
Parallel lines	Parent functions	Perpendicular lines	
Proportion	Rate of Change	Slope	Slope-intercept form
Standard form	Transformation	Translation	

TAKS VOCABULARY REVIEW

dilate	parameter	reflect	rotate	transformation	translation
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MATERIALS

Cornell notes	graphing calculators	manipulatives	hexagon shapes
textbook	D2SC Patterns WS/PPTs	laptop computer	

AVID and ESL Strategies

Think-Pair-Share	4 Corners	Expert/Consultant
Carousel	KWL	Frayar/Venn diagrams
Quick Write	Quick Work	Marzano's 6 Steps - Vocabulary

TECHNOLOGY

Reminder: Students will bring laptops to class.

Cognitive Tutor: Students start to see the multiple representations of functions really well with this software program. The program will require the students to read a scenario and generate a function and then graph. Students are asked to find the meaning of the slope and the intercepts.

Understanding Math; Holt Online.

Gizmos	On-line TEKS Related Games
Interventions	Assessments

SPIRALING & TAKS

Equations, expressions, proportions, ratios, percents, translations through warm-ups.

4th PERIOD (as time allows in other periods)

Teacher discretion regarding which activities fit the needs of their students.

Human Graph Challenge: This is a good activity for those tactile-kinesthetic learners who need movement to help them learn better. Have a life-sized graph on your classroom floor (or hallway) and break your class into teams. They will work one team at a time to graph a linear function in the shortest amount of time as possible.

Cockroach Game; Word Wall creation; Graph Match Game; Graph Bingo; Gizmos; Cognitive Tutor; Understanding Math; Exercise Activity; Hot Air Balloon Activity & Excel Sheet; Our Hero, Parts 1 and 2.

Writing and Graphing Linear Equations

“The study of linear functions is important as it provides students with their first experience of identifying and interpreting the relationship between two dependent variables. ‘Linear functions’ is certainly a basic algebra topic but it is of fundamental, not trivial, importance. It marks the point at which many students decide that mathematics is meaningless and difficult.”

Robyn Pierce

Linear Functions and a Triple Influence of Teaching on the Development of Students’ Algebraic Expectation (2005)

STATE/DISTRICT OBJECTIVES:

- [111.32.B.A.06.A](#) - The student is expected to develop the concept of slope as rate of change and determine slopes from graphs, tables, and algebraic representations;
- [111.32.B.A.06.B](#) - The student is expected to interpret the meaning of slope and intercepts in situations using data, symbolic representations, or graphs ;
- [111.32.B.A.06.C](#) - The student is expected to investigate, describe, and predict the effects of changes in m and b on the graph of $y = mx + b$;
- [111.32.B.A.06.D](#) - The student is expected to graph and write equations of lines given characteristics such as two points, a point and a slope, or a slope and y intercept;
- [111.32.B.A.06.F](#) - The student is expected to interpret and predict the effects of changing slope and y -intercept in applied situations ;
- [111.32.B.A.07.A](#) - The student is expected to analyze situations involving linear functions and formulate linear equations or inequalities to solve problems ;
- [111.32.B.A.07.B](#) - The student is expected to investigate methods for solving linear equations and inequalities using concrete models, graphs, and the properties of equality, select a method, and solve the equations and inequalities ;
- [111.32.B.A.07.C](#) - The student is expected to interpret and determine the reasonableness of solutions to linear equations and inequalities.

Teacher TAKS Skills Preview:

- use slope as the basis for writing equations (this likely means that the first types of equations your students will write will be in point-slope form, which can then lead naturally into slope-intercept form)
- concentrate on multiple representations, especially tables and graphs at first, finding slope from these, and using that slope to write equations
- use multiple representations, taking advantage of verbal representations as a good jumping off point for writing linear equations in standard form since that is a natural flow
- address the meanings of slope and intercepts in context, as well as what independent and dependent variables represent in the context of a real world problem

Monday, November 30, 2009**TEKS CHECK #3****Warm-Up:** TAKS prep**Engage:** N/A**Explore:** N/A**Explain:** Go over quiz and/or homework; review multiple representations, standard form (week 3.1) as lead in to week 3.2; begin tomorrow's lesson as time allows.**Elaborate:** N/A**Evaluate:** District formal assessment TC3; 4th period complete Voyager testing as time allows.**Tuesday, December 1, 2009**

Standard Form to Slope-Intercept Form, Intercepts, and Slope (continued)

Holt 5-1, 5-2, & 5-6; TEKS A.6A-D, A.7.A-C

Warm-Up: TAKS prep**Engage:** Relate standard form to word problems using real world examples and the D2SC resource Anna's Bakery.**Objective:** The students will use standard form to find x- and y-intercepts and interpret their meanings in real-world situations. The student will use x- and y-intercepts to graph linear equations. The student will use newly-acquired vocabulary (see 3rd Six Weeks List) in the classroom setting when working with peers and when reading grade-level mathematics problems – both free response showing all of their work and multiple choice.**Explore: Anna's Bakery Activity.** Discuss limits in life from individual, business, and country standpoints; apply to bakery problem. Students will determine feasible combinations of the variables given cost or quantity constraints.**Elaborate: Think-Pair-Share.** Independently, each student will determine how the slope, the x-intercept and the y-intercept change when the cost of the input(s) varies. They will discuss their results with their partner, discover whether or not they agree, find a supporting reason which explains the accuracy of their results in words (related specifically to the problem.)**Explain:** The teacher will relate Anna's Bakery problem to a Production Possibilities Frontier faced by businesses and countries to demonstrate to the students in a concrete way the use of Algebra in day to day decision-making. (**Honors:** Discuss Comparative Advantage and have the students determine optimal course of action.)**Evaluate:** Informal assessment by the teacher as he/she interacts with the students and checks on their understanding/progress.

Wednesday, December 2, 2009

Relating the 3 Forms of Linear Equations TEKS A.6A-D, A.7.A-C
Point-Slope Form, Slope-Intercept Form, and Standard Form Holt 5-6 & 5-7

Warm-Up: TAKS prep

Engage: Help the students recall yesterday's conclusions; Discuss limits in life from individual, business, and country standpoints; apply to bakery problem. Students will determine feasible combinations of the variables given cost or quantity constraints. The students will come up with a situation where a decision must be made due to a specific constraint. (income, speed limit, resources, etc.). Then the students will take turns explaining their scenario to their partner and listening to their partner's scenario. The teacher will lead a discussion using 1 or 2 examples the students have chosen.

Explore: Students will:

- A. Compare and Contrast the 3 Forms of Linear Functions using Think-Pair-Share
- B. Use the models they created yesterday (along with manipulatives representing the variables) to:
- 1.) determine which variable is independent, and which is dependent
 - 2.) determine a feasible domain and range
 - 3.) complete all representations/forms on the multi-representations sheet
 - 4.) explain the meaning of the slope in a complete sentence
 - 5.) explain the meaning of the intercepts in complete sentences
 - 6.) choose a solution (a point on the line) and explain why the choice was made

Elaborate: The teacher will give an example and then demonstrate how to present the equation in all 3 forms. Using their own examples, the students will write their equations in all 3 forms.

- How do I know that the rate of change is constant for a linear function?
- What can one representation of a function tell me that another representation cannot?
- When is it most useful or efficient to use a particular form of a linear equation?
- What common real world situations can be represented using linear functions?
- Which is most useful? Under which conditions?
- Why and When would either of the other forms be useful?

Evaluate: The students will complete a multiple representations model of their problem. (**Honors:** The students will write a summary about how they chose the solution to their model, and how their solution might have changed if input information changed.)

Thursday, December 3, 2009

Putting It All Together Holt 5-1 through 5-7; TEKS A.6A-D, A.7.A-C
Point-Slope Form, Slope-Intercept Form, Standard Form;
Patterns, Rate of Change, Slope;
Domain & Range, Dependent & Independent;
Graphs, Tables, Ordered Pairs, Words and Equations

Warm-Up: TAKS prep

Engage: Relate standard form to word problems using 1 or more D2SC resources set up at stations so that the students may choose the problem they would like to work: Exercise Activity; Hot Air Balloon & Excel Sheet; Our Hero, Parts 1 & 2; Alternatively, 1.) Use multiple representation worksheets with partial information given such that the student must derive the remaining representations 2.) Practice A&M: 7-1, 7-2, 7-3, 7-5.

Objective: The students will find slope and y-intercept, from slope and a point, from 2 points, from a graph, from a table, from a word problem.

Explore: Using the models they created yesterday, along with manipulatives representing the variables, in writing the students will:

- 1.) Determine which variable is independent, and which is dependent.
- 2.) Determine a feasible domain and range.
- 3.) Complete all representations/forms on the multi-representations sheet.
- 4.) Explain the meaning of the slope in a complete sentence.
- 5.) Explain the meaning of the intercepts in complete sentences.
- 6.) Choose a solution (a point on the line) and explain why the choice was made.

Elaborate: Have the students explain their multiple representation table to another person who is not currently in Algebra and have him/her write one thing that they learned from the student's explanation.

Evaluate: Informal - Teacher will peruse the room using the Socratic Method to check for understanding and pull correct understanding from the students' experience.

Friday, December 4, 2009

Putting It All Together Holt 5-1 through 5-7; TEKS A.6A-D, A.7.A-C

Point-Slope Form, Slope-Intercept Form, Standard Form;
Patterns, Rate of Change, Slope;
Domain & Range, Dependent & Independent;
Graphs, Tables, Ordered Pairs, Words and Equations

Warm-up: TAKS prep**Engage:** N/A

Objective: The students will relate domain/range, independent/dependent, rate of change/slope to word problems represented by linear equations. Students will demonstrate understanding of the relationships between the multiple representations of linear equations and their associated meanings.

Explore: N/A**Explain:** N/A**Elaborate:** N/A

Evaluate: Formal Assessment: Quiz Grade based on Multiple Representations Drill.

The Garden (Algebra 1 Assessment)

Interpreting the meaning of a functional relationship; creating verbal & algebraic descriptions from graph

The Contractor (Algebra 1 Assessment)

Writing a linear equation given complicated real-world information; creating a table and graph from verbal

HOLT Chapter 5 Review (Less 5-8)

A&M: 7-1, 7-2, 7-3, 7-5.